



Contents lists available at ScienceDirect

Journal of Pediatric Nursing

journal homepage: www.pediatricnursing.org

Development of Adolescents' perceptions of the nursing image scale and evaluation of its psychometric properties: A methodological study

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ARTICLE INFO

Article history:

Received 17 May 2023

Revised 2 January 2024

Accepted 2 January 2024

Keywords:

Adolescent

Attitude

Instrumental study

Nursing image

Professional development

Psychometric

ABSTRACT

Background and purpose: It is important to assess the perception of the nursing image among adolescents, the group closest to the career decision, to enhance their view of the nursing image. This study was conducted to develop the Adolescents' Perceptions of Nursing Image Scale (APNIS) and evaluate its psychometric properties.

Method: The study has a descriptive, cross-sectional, correlational, and methodological design. The study was conducted with 614 adolescents aged 12–18 years in Turkey between October 15, 2022, and December 15, 2022. The data were analyzed using the Kaiser–Meyer–Olkin coefficient, Barlett's test, factor analyses, Cronbach's alpha reliability coefficient, split-half analysis, item sum statistics, Hotelling's T^2 , and test-retest analysis.

Results: As a result of the explanatory factor analysis, the items on the scale were collected under six sub-dimensions, and the scale explained 62.843% of the total variance. Confirmatory factor analysis showed that the model fit was adequate. The total internal consistency Cronbach alpha value of the scale is 0.90, and the sub-dimension Cronbach alpha values are between 0.70 and 0.90. The Spearman–Brown coefficient of the scale was 0.94, the Guttman-split-half coefficient was 0.94, Hotelling's T^2 value was 373.829, $F = 9.510$, and $p < 0.001$. As a result of the Tukey summability analysis, $F = 0.431$ and $p > 0.05$, the scale was found to be summable. The test-retest result of the scale was $r = 0.899$.

Conclusion: The 38-item APNIS is a valid and reliable tool that assesses adolescents' perceptions of the nursing image.

Practice implications: The scale, including universal items about the nursing image, is easy and practical to use.

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Introduction

Nursing is an art form that involves knowledge, skills, empathy, bravery, imagination, sensitivity, and an ethical attitude. Beyond its scientific aspect, nursing is a profession that encompasses intuition, emotion, compassion, and kindness (McAllister & Brien, 2020). Nurses have a vital role among health professionals in providing quality treatment, implementing preventative health services, and enhancing the health of individuals, families, and society (Rodríguez-Gázquez et al., 2021).

The image of the nursing profession, which differs among countries and has changed significantly over time, is an important element in choosing the nursing profession. Nursing was once thought to be a

more feminine and maternal occupation (McAllister & Brien, 2020). The image of nursing has evolved with the admission of males into the field, and while male nurses are more at the forefront in technical abilities, female nurses are more at the forefront in relationships and communication (Liu et al., 2019). The depiction of nursing in the media, including newspapers, TV shows, and films, also has an impact on the image of nursing (ten Hoeve et al., 2014). According to an integrated review of the literature on the social image of nursing, and publications from many countries, including Turkey, society has a lot of misconceptions about nurses based on myths and stereotypes (López-Verdugo et al., 2021). Nurses were described as self-sacrificing and kind in a mixed-method study, but they were also described as fatigued and indifferent (Apaydin Cirik et al., 2022). In a qualitative study of elementary school students' perspectives on nursing, the nursing profession was defined as one that gives injections, administers treatment, assists doctors, cares for patients and children, and heals patients (Yılmaz & Esenay, 2020). In a study evaluating the nurse perceptions

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of hospitalized children, nurses were mostly perceived as women (Uysal et al., 2018). To enhance future demand for nursing and improve the image of nursing, new definitions that go beyond Nightingale's "angelic lady with a lamp" dominant definition should be developed, and its role within health systems should be elevated (Bennett et al., 2020).

Nursing has evolved into a prestigious profession with high ethical standards (Brrenan, 2023; National Academies of Sciences, Engineering, and Medicine, 2021). The COVID-19 pandemic has highlighted the nursing profession's perception of having status and the power to actively save people's lives. In this vein, sexualized representations of nursing in the press began to give way to professional pictures, and 2020 was declared the "Year of Nurses and Midwives" (Bennett et al., 2020). In Turkey, the COVID-19 pandemic has also improved students' perceptions of the nursing image (Batmaz et al., 2022). A study analyzing the attitudes of 1853 individuals who received primary health care services in Turkey regarding the image of nursing showed that perceptions of the nursing image deteriorated and became unfavorable as the participants' ages progressed (Mat & Baykal, 2021). The image of individuals' professional perceptions is formed at a young age (Glerean et al., 2017). Therefore, assessing children's perceptions of the nursing image at a young age and identifying variables that may negatively affect their views in advance may be beneficial in enhancing societal perceptions of the nursing image. In studies conducted with children, those who wanted to become nurses listed their reasons as helping people, being useful to society, and helping a sick friend (Duzkaya et al., 2014; Yilmaz & Esenay, 2020). Festini et al. (2012) revealed that 60% of children characterized the nurse as a person who cares for or assists sick people. In another study, children characterized the nurse as having positive traits like smiling, happy, good, caring, and kind (Akkavak & Karabudak, 2019).

Early evaluation of perceptions of the nursing image is also important in career selection. The decision to enter the nursing profession and the decision to remain in the profession over time are strongly tied to society's view of the profession's professional image (López-Verdugo et al., 2021). While considering adolescent job choices, it is beneficial to analyze their attitudes toward occupations. The choice of career is one of the most critical decisions a person will make in his or her life and has far-reaching consequences (Kuzgun, 2019). Understanding adolescents' perceptions of the nursing image may allow nurses' behaviors to be viewed through adolescents' eyes. This definition is important to improve adolescents' perceptions of the nursing image, help them perceive nursing correctly and prefer the profession. This study aimed to develop a nursing image scale to evaluate the perceptions of nursing image among 12–18-year-old adolescents and to evaluate its psychometric properties.

Method

Study design

The study has a descriptive, cross-sectional, correlational, and methodological design. In this study, a scale was developed, and its psychometric properties were evaluated (Fig. 1). The study adhered to EQUATOR guidelines of reporting research using the Strengthening of Reporting of Observational Studies in Epidemiology (STROBE) checklist.

Study population and sample

The study was conducted between October 15, 2022, and December 15, 2022, with adolescents aged 12–18 years old attending six schools in a provincial center in Turkey. Once all schools were identified, each was assigned a number. Subsequently, a selection of six schools from the entire pool was made using the simple random sampling method. These chosen schools are in the city center, and they enroll adolescents with comparable socio-demographic characteristics, specifically from

families sharing similar traits. The inclusion criteria of the study were: a) being an adolescent aged 12–18; b) volunteering to participate in the study, c) being able to read and understand the questions on the scale; d) having a parental consent form. The exclusion criteria of the study were not accepting to participate in the study.

Scale development research requires a sample size that is 5 to 10 times the scale's number of items. In scale development and validity and reliability studies, sample size is evaluated as follows: <100: very low; 100–200: low; 300: good; and 500–1000: very good. A researcher should take at least five people per item to perform factor analysis (Karagöz, 2019; Seçer, 2018). Because the Adolescents' Perceptions of the Nursing Image includes 59 items, the number of adolescents per item was calculated as between 5 and 10, and it was planned to include 590 adolescents in the study. The sample was recruited using a simple random selection procedure of adolescents aged 12–18 years. The sample consisted of 614 adolescents who met the inclusion criteria and agreed to participate in the study. In this study, 194 adolescents did not participate in the study because their parents did not give permission, and 138 adolescents did not want to participate in the study.

Data collection

The researchers informed the administrators and instructors of the relevant schools about the objective of the research after receiving ethics committee and institutional approval. Teachers informed the parents of the adolescents who fulfilled the inclusion criteria about the study's objective. After that, through Google Forms, a link was sent to the phones of the parents who agreed to participate in the study. When the parents clicked on the Google form link, they approved the consent form for their child's involvement. The adolescents were permitted to fill out the data-collection forms once their parents had given their permission.

Data collection tools

The data were collected using the "Adolescent Descriptive Information Form" and the "Adolescents' Perceptions of Nursing Image Scale". The adolescent information form includes questions such as age, gender, parental education level, parental occupations, and the presence of a nurse in the family.

The Adolescents' Perceptions of the Nursing Image Scale (APNIS)

For the Adolescents' Perceptions of the Nursing Image draft, a 68-item scale item pool was created by reviewing the literature (Akkavak & Karabudak, 2019; Apaydin Cirik et al., 2022; College of Nurses of Ontario, 2023; Glerean et al., 2017; National Academies of Sciences, Engineering, and Medicine, 2021; ten Hoeve et al., 2014) and the experiences of the research team in pediatric nursing and image studies. The response options in the draft were constructed as a five-point Likert-type scale with a score range of 1–5 points. The response scale is 1 = Strongly disagree, 2 = Disagree, 3 = Not sure, 4 = Agree, and 5 = Strongly agree. The participants were asked to score each item on the scale by marking one of these options on a 5-point Likert scale. There are no reverse-scored items on the scale.

Scale scoring

The APNIS scale consists of 38 items and 6 sub-dimensions. On this scale, the minimum score is 38 (38×1), and the maximum score is 190 (38×5). High scores indicate that adolescents have high perceptions of the nursing image. Based on the scores obtained from the scale, it is evident that the perceptions of the nursing image among adolescents decreased as they approached 38 points, and conversely, perceptions of the nursing image increased as they approached 190 points.

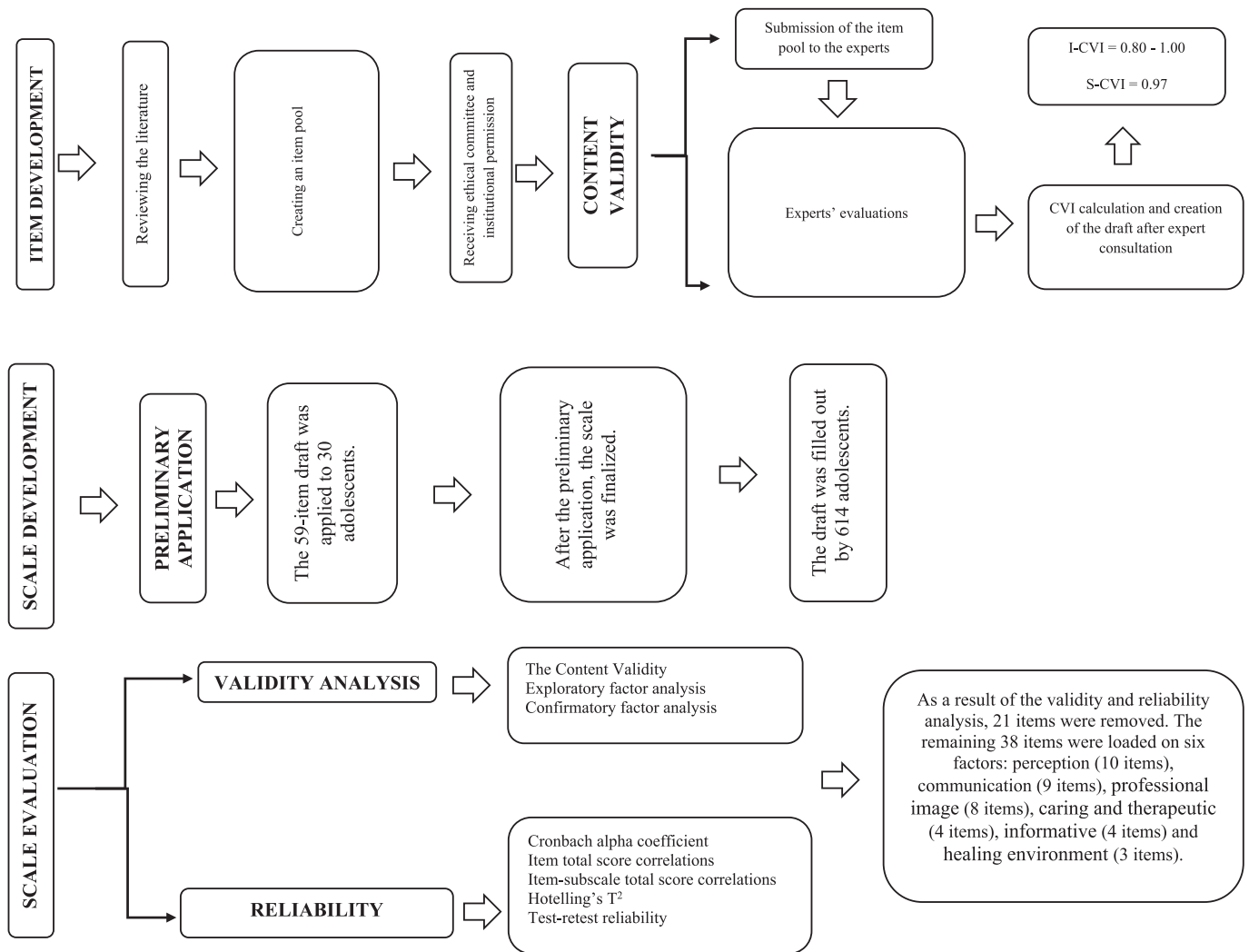


Fig. 1. Research process.

Validity analysis

Content validity

The draft was evaluated and edited in terms of language, meaning, integrity, and spelling rules with the support of two experts from the Department of Turkish Language and Literature. After the draft was edited, a total of ten experts in the fields of pediatric nursing, pediatricians, psychologists, and educational sciences were consulted for content validity. These experts were carefully selected, ensuring that each possessed experience in either scale development or in conducting studies related to scale validity and reliability. The experts calculated the content validity indices of each item in the draft. Accordingly, in this study, the item-based content validity index (I-CVI) was found to be between 0.80 and 1.00, and the scale-based content validity index (S-CVI) was found to be 0.97. CVI \geq 0.80 is accepted as a criterion. These results show that there is a consensus among experts (Almanasreh et al., 2019; DeVellis, 2016; Seçer, 2018). In line with the suggestions of the experts, the items in the draft were revised, and nine items were removed from the scale. The items that were eliminated based on the experts' recommendations were deemed inadequate for the adolescent age group in terms of language, content, and overall comprehensibility, according to the expert evaluations.

Preliminary test phase

As a result of the expert evaluations, a preliminary study was conducted to evaluate the legibility, comprehensibility, and clarity of the draft, on which a consensus was reached. In this direction, a preliminary study was conducted with a group of 30 adolescents (12–18 years old) with similar characteristics to the inclusion criteria, but this group was not included in the main research sample. Based on the findings from the preliminary study, necessary revisions were made, and the scale was finalized.

Construct validity

Exploratory factor analysis. For validity analyses, the database was randomly split into two halves. Exploratory Factor Analysis (EFA) is defined as an organized simplification of interrelated items, while Confirmatory factor analysis (CFA) is a statistical technique that confirms the factor structure identified by EFA. The EFA was conducted in the first half. The KMO was applied to test the sample size for factor analysis, and the Bartlett's test was applied to evaluate the suitability of the data for factor analysis. For EFA, explanatory factor analysis was applied using the principal axis factoring method and Promax rotation. To perform factor analysis, it is necessary for the KMO value to exceed 0.60, and

Bartlett's test should yield a significant result. In EFA, the factor loadings of the items within the scale should surpass 0.40, and the eigenvalues should be >1 (DeVellis, 2016; Kline, 2016; Lee & Wang, 2014; Wang & Wang, 2019).

Confirmatory factor analysis. The CFA was used to test the structure obtained from the EFA. In CFA values, sub-dimension loadings should be higher than 0.30 (DeVellis, 2016; Kline, 2016; Lee & Wang, 2014; Wang & Wang, 2019). The suitability of the model to be tested with CFA was evaluated using fit indices. Model fit was evaluated with chi-square (χ^2), degrees of freedom (df), χ^2/df , Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (sRMR), Comparative Fit Index (CFI), Incremental Fit Index (IFI), and Tucker–Lewis Index (TLI) (DeVellis, 2016; Kline, 2016; Wang & Wang, 2019). As stated in the literature, a χ^2/df ratio lower than 3 points indicates a perfect fit (Kline, 2016). The fit indices of the scale (RMSEA < 0.08 ; NFI > 0.90 ; sRMR < 0.08 ; CFI > 0.90) indicate an acceptable good fit of the model (DeVellis, 2016; Tabachnick & Fidel, 2013).

Reliability analysis

Internal consistency analysis

To determine the reliability of the scale, correlation coefficients, split-half analysis (Spearman-Brown and Guttman split-half values), internal consistency analysis, item statistics, and test-retest analyses were performed for the invariance of the scale. The assessment of normal distribution for the data involved an examination of skewness and kurtosis. In this study, an analysis of mean scores revealed that the scale and subscales exhibited moderate levels. The kurtosis and skewness values were found to adhere to the criteria of falling between -1.5 and $+1.5$, as expected for a normal distribution. The internal consistency coefficients serve as a criterion, providing insights into the accuracy of the measurement tool in capturing the same conceptual structure and whether the items within the scale demonstrate consistency with each other. Internal consistency analyses of the scale were performed with Cronbach's alpha. According to the recommendation by Nunnally and Bernstein (1994), alpha internal consistency coefficients should exceed 0.70. Item-total correlation values were calculated to test the reliability of the scale items. The item-total correlation value determines whether the scale has a high level of internal consistency and whether the items in the scale are sufficient to measure what is desired. A recommended threshold for the item-total correlation value is >0.30 (DeVellis, 2016; Karagöz, 2019; Nunnally & Bernstein, 1994; Seçer, 2018). Hotelling's T^2 test was performed to test whether the adolescents' responses to the scale items were equal (response bias). The response bias of the scale was evaluated by Hotelling's T^2 test, $p < 0.05$ was accepted as the level of significance (DeVellis, 2016; Johnson & Christensen, 2019; Karagöz, 2019).

Test-retest reliability

Test-retest reliability is the application of a measurement tool to the same group twice under the same conditions at a time interval long enough to prevent significant recall but short enough to prevent significant changes in the characteristic to be measured (Polit & Yang, 2016). It is recommended to perform the test-retest between 2 and 6 weeks. In this study, test-retest was performed at the fourth week.

Data analyses

The statistical Package for the Social Sciences (SPSS) 25 package, SPSS AMOS 24.0, and Jamovi 2.3 programs were used for data analysis. In the analysis of adolescents' descriptive statistics, including number, percentage, mean, and standard deviation, were used. As for validity analyses, the Davis Technique was used for content validity analysis, the KMO, coefficient, the Bartlett Test, exploratory factor analysis, and

confirmatory factor analysis were performed for factor analysis. Reliability analyses were performed on the whole sample. Before factor analysis, the database was divided into two parts. EFA was conducted with one half and CFA with the other. Reliability analysis was conducted without splitting the data set into two. For the reliability analysis, Cronbach's alpha reliability coefficient for internal consistency analysis, split-half analysis, item-total correlation, Hotelling's T^2 , and test-retest analysis for the invariance of the scale were used.

Ethics considerations

Ethical approval was first obtained from the Scientific Research and Publication Ethics Committee of a university (date 28/07/2022 and number 2022/5). Institutional permission was obtained from the Provincial Directorate of National Education for the relevant schools. Participation in the study was voluntary. Therefore, parents and adolescents were informed about the purpose of the study. In the data collection process, Google forms were sent to the phones of the parents, along with a form containing the purpose of the study and the contact information of the responsible researcher. With this form, the parents agreed that their adolescent children, aged 12–18 years, may participate in the study and that the material gathered might be used for scientific publication. Then, the adolescents filled out the questionnaire form. In this process, those who wanted to leave the study could leave by shutting down the form.

Results

Demographic data

The mean age of the adolescents in the study was 15.20 ± 1.81 years. Among the adolescents included in the study, 20.2% were studying at secondary school and 79.8% at high school. 12.7% of the adolescents had chronic diseases, and 60.6% were not hospitalized. 21.8% of the adolescents had a nurse in their family, and 80.3% did not want to be a nurse (Table 1).

In this study, 52.6% of the adolescents were male, 39.7% of their mothers, and 38.3% of their fathers had a high school education. 35.8% of the mothers and 99.5% of the fathers were employed. 81.8% of the mothers and 93.3% of the fathers of the adolescents did not work in the health sector. 18.2% of their mothers and 6.7% of their fathers were healthcare professionals.

Construct validity of the APNIS

A total of 21 items were removed from the scale because 7 items (items 9, 11, 31, 32, 36, 45, and 58) had an item-total score correlation below 0.2, 1 item (item 59) disrupted the CFA fit index and the factor

Table 1
Sociodemographic characteristics ($n = 614$).

Characteristics		Participants	
Age (Mean \pm SD)		15.20 \pm 1.81	
		Frequency	Percentage
Gender	Female	291	47.4
	Male	323	52.6
Education Level	Secondary school	124	20.2
	High school	490	79.8
Having a chronic disease	Yes	78	12.7
	No	536	87.3
Hospitalization	Yes	242	39.4
	No	372	60.6
Having a nurse family member	Yes	134	21.8
	No	480	78.2
Wanting to be a nurse	Yes	121	19.7
	No	493	80.3

was below 0.30, and 13 items (items 10, 16, 20, 27, 35, 33, 34, 37, 38, 43, 44, 50, and 55) created factor loadings in more than one sub-dimension. Accordingly, a total of 38 items remained on the scale, and analyses were conducted on these items.

In principal axis factoring analysis, first, the Kaiser-Meyer-Olkin test and Bartlett's test were performed to determine the sampling adequacy and suitability of the data for factor analysis. The KMO value, which indicates that the sample is sufficient for exploratory factor analysis, was found to be 0.907. Bartlett's test, which shows the suitability of the data for factor analysis, was found to be chi-square = 9106.696 and $p < 0.001$ (Table 2).

As a result of EFA, the items on the scale were categorized under six sub-dimensions, and the scale explained 62.843% of the total variance. The first (factor 1), second (factor 2), third (factor 3), fourth (factor 4), fifth (factor 5), and sixth (factor 6) sub-dimensions of the scale explain 29.260%, 16.841%, 6.838%, 4.488%, 3.717% and 1.699% of the total variance, respectively. The factor loadings of the items in the six sub-dimensions vary between 0.658 and 0.944, 0.610 and 0.857, 0.570 and 0.945, 0.686 and 0.943, 0.467 and 0.804, and 0.522, and 0.605, respectively. The eigenvalues of the factors are 11.473, 6.723, 2.993, 2.018, 1.805, and 1.083, respectively (Table 2).

The CFA results for the scale are presented in Fig. 2. In the CFA, the factor loadings of the six sub-dimensions ranged between 0.32 and 0.72, 0.35 and 0.73, 0.59 and 0.84, 0.54 and 0.77, 0.39 and 0.64, and 0.73 and 0.75, respectively. Fit indices of the scale: Chi-square (χ^2) = 1097.471, degrees of freedom (df) = 641, $\chi^2 / df = 1.712$, $p = 0.000$, RMSEA = 0.048, Comparative Fit Index (CFI) = 0.90, Incremental Fit

Index (IFI) = 0.90, Tucker-Lewis Index (TLI) = 0.89, and Goodness of Fit (GFI) = 0.85, PCLOSE = 0.721.

Labelling of factors

Labeling the sub-dimensions of a scale is recommended to be based on common features of the items, and if common features are not evident, it is advised to consider naming based on items with the largest factor loadings. This process should consider relevant literature, suggestions from experts, and the professional experiences of the researchers (Akkavak & Karabudak, 2019; Apaydin Cirik et al., 2022; College of Nurses of Ontario, 2023; Çınar & Demir, 2009; Glerean et al., 2017; Liu et al., 2019; National Academies of Sciences, Engineering, and Medicine, 2021; ten Hoeve et al., 2014). In the current study, the labeling of sub-dimensions was determined by considering both the common features of the items and expert opinions.

Reliability analysis of the APNIS

The total internal consistency Cronbach Alpha value of the scale is 0.90. Professional Image (10 items), Perception (9 items), Caring and Therapeutic (8 items), Communication (4 items), Informative (4 items), and Healing Environment (3 items) sub-dimension reliability coefficients are $\alpha = 0.90$, $\alpha = 0.88$, $\alpha = 0.89$, $\alpha = 0.84$, $\alpha = 0.70$, and $\alpha = 0.79$, respectively. In the reliability analysis, the Cronbach alpha value is 0.818 for the first half and 0.831 for the second half, according to the split-half analysis. The Spearman-Brown coefficient is

Table 2
Exploratory factor analysis of the APNIS (n = 307).

Items	Item number	Factor	Factor loading values in principal component analysis	Rate of variances explained by factors	EFA Results
Nursing is a regulated profession.	Item 46	Factor 1 (Professional Image)	0.746	29.260%	KMO = 0.907, Bartlett's test, $\chi^2 = 9106,696$, $p < 0.001$
To become a nurse, it is necessary to finish the relevant school.	Item 47		0.796		
Both women and men can be nurses.	Item 48		0.938		
Nurses are employed in hospitals.	Item 49		0.897		
Nursing is a knowledge and skill-based profession.	Item 51		0.675		
Nursing is a profession that protects health.	Item 52		0.826		
Nursing is a profession that requires patience.	Item 53		0.941		
Nursing is a respected profession.	Item 54		0.886		
Nursing is a profession that helps people in need of care.	Item 56		0.944		
Nurses are the most important members of the health care team.	Item 57		0.658		
Nurses are reliable.	Item 21	Factor 2 (Perception)	0.610	16.841%	
Nurses are respectful.	Item 22		0.857		
Nurses are helpful.	Item 23		0.786		
Nurses are kind.	Item 24		0.717		
Nurses are affectionate.	Item 25		0.853		
Nurses are smiling.	Item 26		0.764		
Nurses are skillful.	Item 28		0.724		
Nurses are knowledgeable.	Item 29		0.778		
Nurses are fun.	Item 30		0.712		
Nurses care for patients.	Item 1	Factor 3 (Caring and therapeutic)	0.635	6.838%	
Nurses treat patients.	Item 2		0.712		
Nurses dress wounds.	Item 3		0.945		
Nurses give injections.	Item 4		0.777		
Nurses give vaccines.	Item 5		0.777		
Nurses measure blood pressure.	Item 6		0.825		
Nurses heal wounds.	Item 7		0.611		
Nursing is a profession that implements the doctor's order.	Item 8	0.570			
Nursing is among the important professions.	Item 39	Factor 4 (Communication)	0.841	4.488%	
Nurses communicate in a language that patients understand.	Item 40		0.943		
Nurses allow patients to ask questions.	Item 41		0.686		
Nurses answer patients' questions.	Item 42		0.720		
Nurses inform patients about their treatment.	Item 12	Factor 5 (Informative)	0.467	3.717%	
Nurses educate patients on the hospital's equipment and devices.	Item 13		0.804		
Nurses give information about the tests to be applied to patients.	Item 14		0.606		
Nurses inform patients about medications (effects and side effects).	Item 15		0.594		
Nurses explain the procedures to parents.	Item 17	Factor 6 (Healing environment)	0.522	1.699%	
Nurses work together with physicians to treat patients.	Item 18		0.605		
Nurses provide a comfortable environment for patients.	Item 19		0.567		

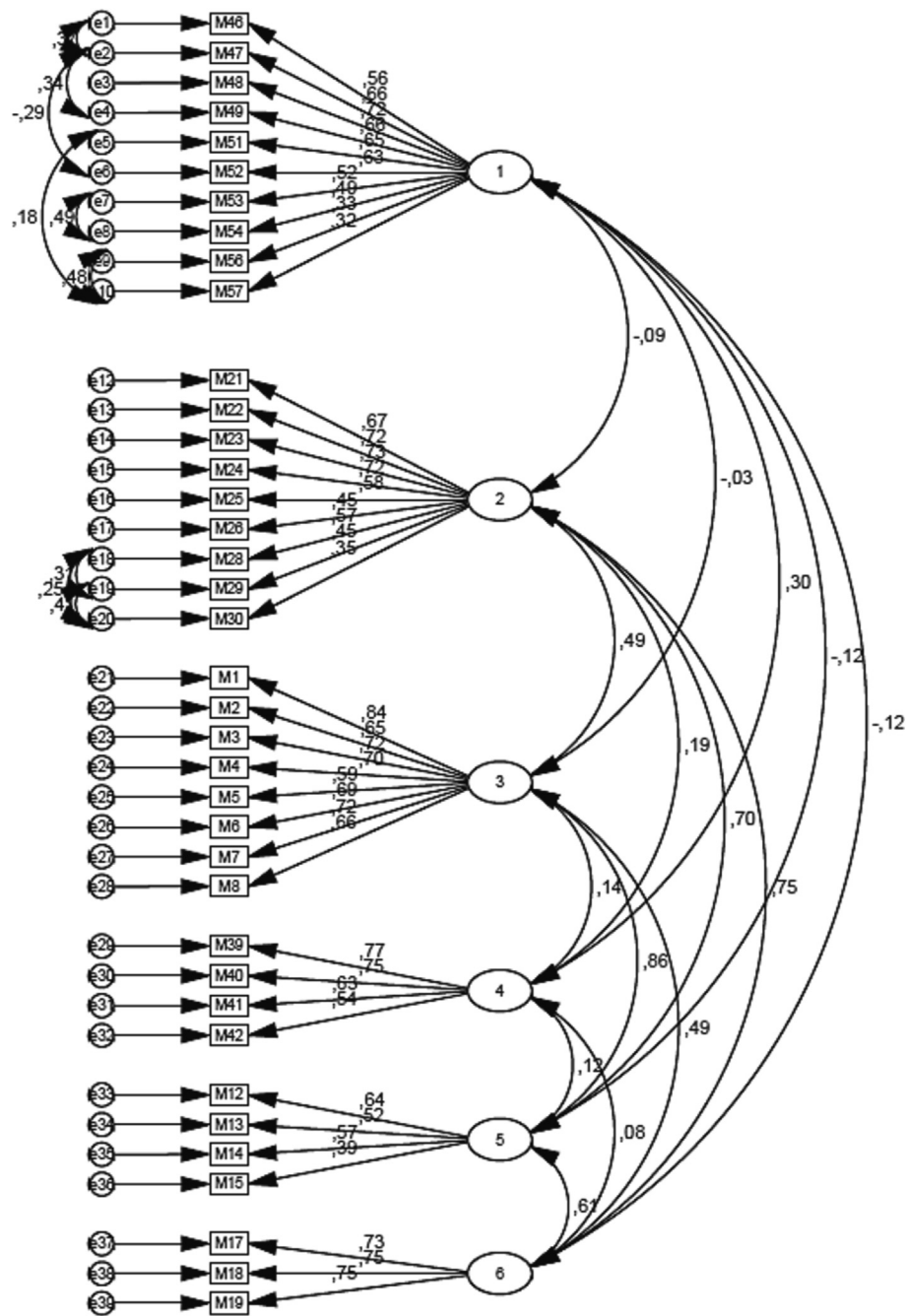


Fig. 2. Confirmatory factor analysis of the APNIS.

0.94, the Guttman-split-half coefficient is 0.94, and the correlation coefficient between the two halves is 0.89 (Table 3). Hotelling's T^2 value on the scale was found to be 373.829, $F = 9.510$ and $p < 0.001$. As a result of the Tukey summability analysis, $F = 0.431$, and $p > 0.05$, suggesting that the scale is summable.

The total item score, item-subdimension score, and subdimension correlation analyses of the APNIS are presented in Table 4. The general item-total score correlation on the scale varies between 0.307 and 0.528. The item subscale correlation values ranged between 0.495 and 0.726 for the professional image subscale, 0.538–0.686 for the perception subscale, 0.612–0.724 for the care and treatment subscale, 0.625–0.721 for the communication subscale, 0.430–0.529 for the informative subscale, and 0.615–0.649 for the healing environment subscale ($p < 0.001$).

Test-retest reliability

The scale was re-administered four weeks after the initial application date. The same scale was used on a new group of 60 students chosen at random from among those who took part in the research. Pearson coefficient calculations showed that $r = 0.899$ and $p = 0.05$ for the APNIS test-retest. For the test-retest, adolescents were assigned an ID during the data collection phase (ID = the first three letters of the child's first name + the first digit of the child's class number + the last two letters of the surname. Example: BCD1EF). In the first application, this ID was created on the form. Four weeks later, schools were revisited, and data were collected again from 60 students who volunteered to participate. In line with this ID, 60 adolescents were matched in the test-retest.

Table 3
Reliability analysis of the scale and subscales.

Subscales	Cronbach α	Split half		Spearman-Brown	Guttman split half	Correlation between two halves
		First half Cronbach α	Second half Cronbach α			
Scale Total	0.908	0.818	0.831	0.939	0.939	0.886
Factor 1: Professional Image	0.900					
Factor 2: Perception	0.881					
Factor 3: Caring and Therapeutic	0.891					
Factor 4: Communication	0.839					
Factor 5: Informative	0.701					
Factor 6: Healing environment	0.787					

Discussion

The image of the nursing profession varies throughout time and within the bounds of professionalism (Brrenan, 2023). Nursing remains an obscure and invisible profession when society fails to recognize nursing as an independent, autonomous, informed, and competent profession (López-Verdugo et al., 2021). Even nursing students may perceive the duties and roles related to the skills and abilities of the nurse differently (Apaydin Cirik et al., 2022; Marcinowicz et al., 2019), so an adolescent who has not received information or education about this profession may, of course, have difficulty evaluating the duties and responsibilities of nursing, thus they may be hesitant to pursue a career in nursing. As a result, it is critical to use a universal, valid, and reliable

scale to assess the perceptions of the nursing image among adolescents, who are closest to making a career decision as the initial step. For this reason, the APNIS created in this study comprises universal items to assess adolescents' perceptions of nursing. Based on the findings of this study, other researchers can modify the scale for their own societies and use it in their research. This scale consists of a total of 38 items that are valid, reliable, quick, and easy to apply. In addition, to the best of our knowledge, this is the first scale to evaluate adolescents' perceptions of the nursing image.

The scale consists of professional image, perception, caring and therapeutic, communication, informative, and healing environment sub-dimensions, which include theoretical knowledge, practical skills, and communication techniques (College of Nurses of Ontario, 2023;

Table 4
Correlations values of the APNIS (n = 614).

Scale subscales	Item number	Item total score correlations		Item-subscale total score correlations	
		r	p	r	p
Professional Image (Factor 1)	Item 46	0.355	<0.001	0.602	<0.001
	Item 47	0.337	<0.001	0.654	<0.001
	Item 48	0.323	<0.001	0.719	<0.001
	Item 49	0.345	<0.001	0.726	<0.001
	Item 51	0.340	<0.001	0.667	<0.001
	Item 52	0.383	<0.001	0.667	<0.001
	Item 53	0.390	<0.001	0.712	<0.001
	Item 54	0.395	<0.001	0.679	<0.001
	Item 56	0.332	<0.001	0.596	<0.001
	Item 57	0.311	<0.001	0.495	<0.001
Perception (Factor 2)	Item 21	0.489	<0.001	0.618	<0.001
	Item 22	0.509	<0.001	0.686	<0.001
	Item 23	0.531	<0.001	0.674	<0.001
	Item 24	0.492	<0.001	0.678	<0.001
	Item 25	0.499	<0.001	0.609	<0.001
	Item 26	0.517	<0.001	0.572	<0.001
	Item 28	0.509	<0.001	0.643	<0.001
	Item 29	0.495	<0.001	0.621	<0.001
	Item 30	0.420	<0.001	0.538	<0.001
	Item 30	0.420	<0.001	0.538	<0.001
Caring and Therapeutic (Factor 3)	Item 1	0.468	<0.001	0.709	<0.001
	Item 2	0.437	<0.001	0.636	<0.001
	Item 3	0.528	<0.001	0.724	<0.001
	Item 4	0.524	<0.001	0.680	<0.001
	Item 5	0.450	<0.001	0.620	<0.001
	Item 6	0.511	<0.001	0.690	<0.001
	Item 7	0.501	<0.001	0.661	<0.001
	Item 8	0.469	<0.001	0.612	<0.001
Communication (Factor 4)	Item 39	0.393	<0.001	0.721	<0.001
	Item 40	0.350	<0.001	0.710	<0.001
	Item 41	0.431	<0.001	0.625	<0.001
	Item 42	0.415	<0.001	0.634	<0.001
Informative (Factor 5)	Item 12	0.481	<0.001	0.501	<0.001
	Item 13	0.307	<0.001	0.499	<0.001
	Item 14	0.477	<0.001	0.529	<0.001
Healing environment (Factor 6)	Item 15	0.376	<0.001	0.430	<0.001
	Item 17	0.450	<0.001	0.618	<0.001
	Item 18	0.475	<0.001	0.615	<0.001
	Item 19	0.470	<0.001	0.649	<0.001
	Item 19	0.470	<0.001	0.649	<0.001

NANDA International Inc, 2018–2020). For the content validity of the scale, the content validity index of the APNIS, scored by the experts with the Davis technique, was evaluated. As a result, the S-CVI value of the scale was calculated as 0.97, and there were no items with a CVI value below 0.80. Because the lowest admissible CVI score is 0.80 (Seçer, 2018; Yusoff, 2019), it can be claimed that the scale can represent the qualities it attempts to assess at a very high level. In the factor analyses of the scale, the KMO value for the evaluation of sample size and factor analysis suitability was 0.907, and Bartlett's test chi-square = 9106.696 ($p < 0.001$). The KMO test values were evaluated as follows: 0.50–0.59 weak, 0.60–0.69 moderate, 0.70–0.79 good, 0.80–0.89 quite good, and 0.90–1.00 excellent. These results indicate that the sample size of the APNIS is “good enough” for factor analyses and that there is an adequate relationship between the variables (Tabachnick & Fidel, 2013; Yong & Pearce, 2013). After the EFA, the total scale consisting of 38 items explains 62.843% of the total variance as 6 sub-dimensions, which suggests that the variance value explained by the scale is sufficient (Field, 2009; Tabachnick & Fidel, 2013). EFA analysis revealed that the factor loadings of the items on the scale were higher than 0.52, and the eigenvalues were above 1 (Lee & Wang, 2014; Seçer, 2018). Since the factor loadings of the items are at moderate and high levels, the construct validity is acceptable (DeVellis, 2016; Harrington, 2009). As a result of CFA, it was determined that the sub-dimension factor loadings were not < 0.32 . In addition, model fit is acceptable based on the results of model fit indices in CFA (DeVellis, 2016; Kline, 2016; Wang & Wang, 2019).

In the reliability analyses of the scale, Cronbach's alpha coefficient for the scale consisting of 38 items was 0.90. Cronbach's alpha coefficient indicates whether the items are related to the subject to be measured and whether the items measure the same feature. A Cronbach's alpha coefficient value of 0.90 indicates that the scale is even more reliable (Hair et al., 2019). The factor loadings of the sub-dimensions were found to vary between 0.70 and 0.90. These results showed that the sub-dimensions had a good internal consistency. The item-total score correlations of the scale vary between $r = 0.307$ and 0.528. This value should be > 0.20 and in a positive direction. Based on this, the items adequately measure the desired quality, and the item reliability of the scale and sub-dimensions is high (Hair et al., 2019; Tabachnick & Fidel, 2013). The Cronbach alpha, Spearman-Brown, and Guttman Split-Half coefficients of both parts in the two-half method used in this study proved that the scale has a high level of reliability. Hotelling's T^2 value, calculated to reveal response bias on the scale, shows that there is no response bias on the scale. The summability analysis indicated that the scale items effectively measured a similar underlying structure, allowing for the derivation of a total score from the scale. Ultimately, test-retest was used for the APNIS reliability study, and it was found that the scale produced consistent findings and demonstrated invariance across time.

Strengths and limitations

The main identified limitation of the study is that the results of the research cannot be generalized to all adolescents. Another limitation of this study lies in the data collection method, which employed random sampling. However, efforts were made to reduce this limitation by employing simple random sampling for school selection and conducting the study with a substantial sample size. Besides, the broad concept of nursing image was evaluated within the scope of predetermined sub-dimensions. The lack of a measurement tool in the literature that evaluates adolescents' perceptions of nursing image is a robust aspect of this study.

Implications for nursing practice

The APNIS is a viable and accurate tool for measuring adolescents' views of the nursing profession. Given the expansive nature of the

nursing image concept, this scale assesses nursing image within specific sub-dimensions, including “Professional Image (10 items), Perception (9 items), Caring and Therapeutic (8 items), Communication (4 items), Informative (4 items), and Healing Environment”. The APNIS assesses adolescents' perceptions of the nursing image in a variety of areas, including professional image, perception, caring and therapeutic, communication, informative, and healing environment. Using the APNIS, support needs can be determined in terms of improving the factors that negatively affect or may affect the perceptions of adolescents.

Conclusion

In accordance with the study's objectives, a nursing image scale was developed to assess the nursing image perceptions of adolescents aged 12–18 years. The scale has demonstrated both validity and reliability, affirming its effectiveness as a valuable tool for evaluating the targeted constructs. As a result of psychometric analyses, the scale consisted of 38 items and six sub-dimensions. The sub-dimensions were defined as 1 = professional image, 2 = perception, 3 = care, and therapeutic, 4 = communication, 5 = informative, and 6 = healing environment. The scale is a 5-point Likert scale (1: Strongly disagree, 2: Disagree, 3: Not sure, 4: Agree, and 5: Strongly agree), and there are no reverse items on the scale. The lowest score that can be obtained from the scale is 38, and the highest score is 190. High scores indicate that adolescents have high perceptions of the nursing image.

Funding sources

This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

CRedit authorship contribution statement

Vildan Apaydin Cirik: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Bahar Aksoy:** Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Murat Bektaş:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Methodology, Formal analysis, Conceptualization.

Declaration of competing interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Acknowledgments

The authors wish to express their deepest appreciation to all adolescents and parents.

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